WHAT IS CLAIMED IS:

1. A perpendicular magnetic recording medium, comprising:

a non-magnetic substrate;

an anti-ferromagnetic layer on said non-magnetic substrate;

said anti-ferromagnetic layer including a Mn alloy containing at least Co at 10 atomic % or greater and 50 atomic % or less;

a soft magnetic layer on said anti-ferromagnetic layer; and

a magnetic recording layer on said soft magnetic layer.

2. A perpendicular magnetic recording medium according to claim 1, further comprising a protective layer on said magnetic recording layer.

3. A perpendicular magnetic recording medium according to claim 2, further comprising liquid lubricant layer on said protective layer.

4. A perpendicular magnetic recording medium comprising:

a nonmagnetic substrate;

an anti-ferromagnetic layer on said non-magnetic substrate;

said non-ferromagnetic layer including a Mn alloy containing at least Ir at 10 atomic % or greater and 30 atomic % or less;

a soft magnetic layer on said anti-ferromagnetic layer; and

a hard magnetic layer on said soft magnetic layer.

5. A perpendicular magnetic recording medium according to claim 4, further comprising a protective layer on said hard magnetic layer.

6. A perpendicular magnetic recording medium according to claim 5, further comprising a liquid lubricant layer on said protective layer.

7. A perpendicular magnetic recording medium as described in Claim 1, wherein said soft magnetic layer is an amorphous alloy containing Co.

8. A perpendicular magnetic recording medium according to claim 4 wherein said soft magnetic layer is an amorphous alloy containing Co.

9. A manufacturing method for a perpendicular magnetic recording medium, comprising:

forming an anti-ferromagnetic layer on a non-magnetic substrate;

forming a soft magnetic layer on said anti-ferromagnetic layer;

forming a magnetic recording layer on said soft magnetic layer;

forming a protective layer on said magnetic recording layer;

forming a liquid lubricant layer on said protective layer;

said anti-ferromagnetic layer is an Mn alloy containing at least Co at 10 atomic % or greater and 50 atomic % or less;

during film formation of at least said anti-ferromagnetic layer and said soft magnetic layer, applying a magnetic field of 796 A/m (10 Oe) or greater that is parallel to a radial direction of said non-magnetic substrate.

10. A manufacturing method for a perpendicular magnetic recording medium comprising:

forming an anti-ferromagnetic layer on a non-magnetic substrate;

forming a soft magnetic layer on said anti-ferromagnetic layer;

forming a magnetic recording layer on said soft magnetic layer;

forming a protective layer on said magnetic recording layer;

forming a liquid lubricant layer on said protective layer;

said anti-ferromagnetic layer is an Mn alloy containing at least Ir at 10 atomic % or greater and 30 atomic % or less;

during film formation of at least said anti-ferromagnetic layer and said soft magnetic layer, applying a magnetic field of 796 A/m (10 Oe) or greater that is parallel to a radial direction of said non-magnetic substrate.

11. A manufacturing method for a perpendicular magnetic recording medium as described in Claim 9, wherein said soft magnetic layer is an amorphous alloy containing Co.

12. A manufacturing method for a perpendicular magnetic recording medium as described in Claim 10, wherein said soft magnetic layer is an amorphous alloy containing Co.